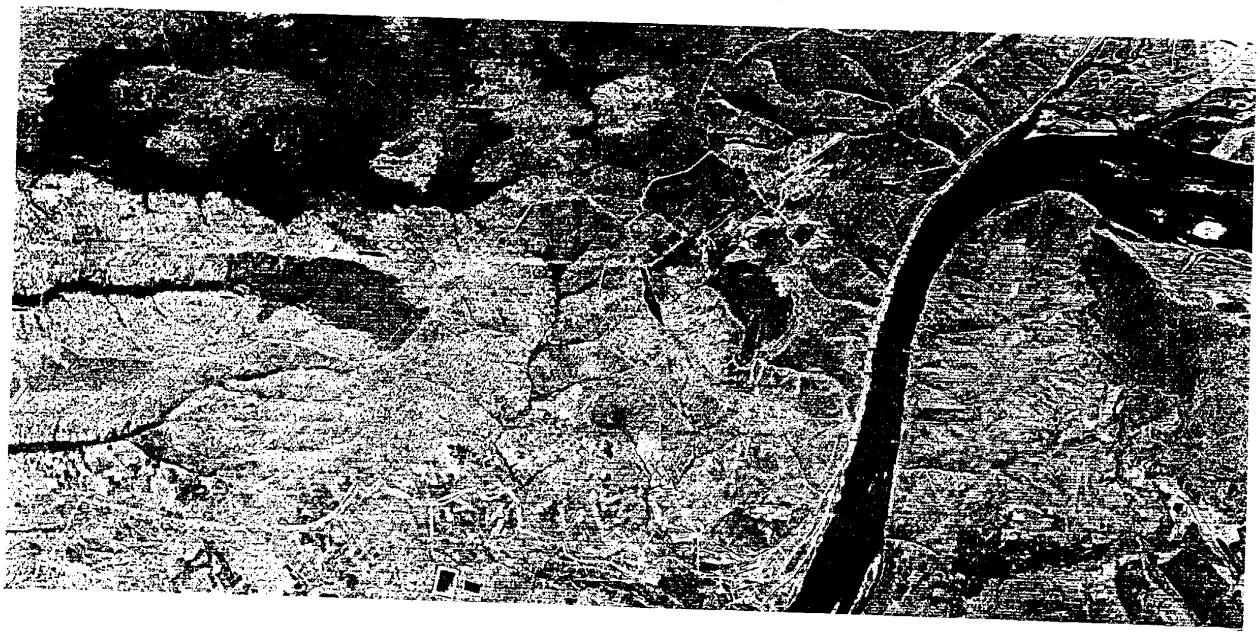
[redacted]



DODONOVO
1-80,000 (Approx.)

25X1

9 May 1968

MEMORANDUM FOR: Director, National Photographic Interpretation Center

SUBJECT : CIA Evaluation of Bi-Spectral Photography from KH 4-B Mission 1103

1. Mission 1103 is the first attempt to obtain a relatively large amount of Bi-Spectral (Bi-Color) photography of intelligence targets in denied areas. The Bi-Color requirement for Mission 1103 was generated principally against

25X1A [redacted]

25X2

2. A comprehensive evaluation of the utility of Bi-Color against [redacted] will be performed in following up the initial requirement. I am concerned, however, that the evaluation of Bi-Color in relation to other intelligence targets may not be as systematically handled as is desirable for future planning purposes. 25X2

3. I propose that a coordinated Agency-wide evaluation of the Bi-Color portions of Mission 1103 be made and that a report be prepared for circulation within the Agency and subsequently to the Community as a whole. The focus of such an evaluation should be on the incremental information judged to have been gained through Bi-Color in comparison with normal black and white. I propose that the scheduling, consolidation, and coordination of such a report be handled by the Regional Analysis Division, OSR (SR/RA) along the

25X1 [redacted] [redacted] 25X1

lines and procedures used routinely in the preparation of the Agency-wide substantive assessments which are produced after each mission.

4. Working closely with the various production components and with OSP, SR/RA will examine the general mission Bi-Color coverage and prepare a listing of targets and categories covered for which the Bi-Color aspect appears germane. OSP is arranging for the preparation and delivery to NPIC of mission materials processed for viewing in Bi-Color. OSP will provide a 30 minute briefing for analysts on the Bi-Color technique, orthoprints, use of the ARES viewing device, and the Bi-Color materials delivery plan. The briefing schedule will be arranged between OSP and SR/RA. SR/RA will arrange a schedule of review and use of the viewing equipment, the preparation of joint analyst-PI evaluations and will integrate the information into a draft report. The draft report will be circulated to the various components for detailed review, coordination, and consolidation before being issued in final form.

5. I recommend that the initial Bi-Color evaluation of Mission 1103 be issued in the form of a "preliminary assessment" by 15 June 1968. At that time the need for additional and more definitive evaluation can be determined. 25X1A

[redacted]

CIA Member COMIREX

Identical memos sent to:
Assistant DDI
Assistant DDS&T
Director OSP
Director OSI
Director OSR
Director FMSAC
Director OER
Director OCI
Director NPIC
Director IAS

25X1A [redacted]

25X1
25X1

[redacted] [redacted]

SECRET

NPIC/TSSG/PPS-111-68
10 May 1968

MEMORANDUM FOR THE RECORD

SUBJECT: Preview of Bi-Color Briefing for IEG P.I.'s by Mr. [redacted] of TSSG/TAD

25X1A

1. The subject briefing was held at 1100 hours on 8 May 1968 in the TSSG Conference Room for the purpose of coordination with related TSSG components. Representatives from PPS, TAS, TAD, DED and TPD were present.

25X1A

2. [redacted] proceeded to give his briefing as he intended to give it to the IEG P.I.'s to assist in their exploitation of bi-color imagery taken on Mission 1103. He used several examples as briefing aids, including previous bi-color satellite mission materials, some lab camera color filtered shots and various systems of viewing this material, including comparison viewing of black-and-white positive transparencies on the light table, superimposition viewing by the ARES, polaroid land color copies of the ARES image, color transparencies of the ARES image, a color transparency made from ortho photographs produced at ACIC and rectified transparencies also produced at ACIC.

25X1A

3. After describing and illustrating the basic principles of bi-color (which he explained is more correctly described by the term bi-spectral), [redacted] posed some of the possible uses and limitations of imagery taken in this mode. He said that the material taken by this process, if properly understood and/or filtered in the viewing or reproduction process, could be relied upon to indicate whether or not objects were most reflective in the red or green regions of the spectrum, but he cautioned emphatically against interpreting the color presentation of this material as being directly analogous to the actual color of the object. He then asked for questions from the floor.

25X1A

4. [redacted] asked whether the convergence of the KH-4 cameras might cause specular reflectance to be misidentified as a "color" signature. [redacted] replied that this was certainly a potential source of difficulty if the sun angle had the corresponding orientation with respect to the camera attitude.

25X1A

25X1A

5. [redacted] asked whether the bi-color imagery might cause some difficulty in stereo-viewing. He said that on the

SECRET

SUBJECT: Preview of Bi-Color Briefing

25X1A [redacted] of TSSG/TAD

samples he was given he was unable to establish satisfactory stereo images when viewing them on the [redacted] High Power Micro- 25X1
stereoscope and that he had gotten a senior P.I. to also look
25X1A at these materials who verified that the stereo effect did not appear to be present. [redacted] questioned whether [redacted] 25X1A
was certain that the stereo images had been properly oriented and pointed out that there was much opportunity for incorrect orientation to be the cause of the degraded stereo effect. Messrs.
25X1A [redacted] were both doubtful that bi-color filtering would
25X1A preclude stereo viewing. Several of those present made arrangements with [redacted] to view the material which he had described in
25X1A hopes of identifying the cause of this stereo viewing difficulty. [redacted] pointed out that they had arranged for extensive stereo viewing tests by several P.I.'s with this same mission material and that none reported any difficulty in stereo perception. All agreed that this question should be resolved.

25X1A

25X1A 6. [redacted] reminded the group that spectrazonal photography was nothing new and that the [redacted] had performed extensive evaluations of spectrazonal photography with their nine lens camera system. He said that he believed that these materials are now on file at the [redacted] 25X1A
tion, and he recommended that we take advantage of the opportunity of using them in furthering our understanding of bi-color photography. At this point, the briefing was completed. All agreed that the briefing would be of much benefit to the P.I.'s.

7. [redacted] 25X1A
should complete the arrangements for presenting this briefing to IEG personnel.

25X1A

8. Just prior to this briefing, [redacted] again discussed the question of whether or not the flicker mode of presentation of bi-color materials would make it possible for a person to discern the differences between the records when viewing them in a stereoscopic device with or without color filters. The question is as
25X1A yet unresolved and it is still not clear what contributions should be made by [redacted] in seeking to answer this question.

[redacted] 25X1A

Chief, Projects & Programs Staff, TSSG, NPIC

Distribution:
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1 -- NPIC/TSSG/TPD
1 -- NPIC/TSSG/[redacted]

ILLEGIB TOP SECRET [redacted] CLASSIFICATION 25X1

Copy ____ of ____ Copies
Page ____ of ____ Pages

14 [redacted] NPIC

MEMORANDUM FOR: Planning, Programming & Budgeting Staff 13 May 68 (DATE)

FROM : CIA (AGENCY) IRS (OFFICE) Reconnaissance Group (DIVISION) Requirements Br.

25X1 THROUGH : IRS/[redacted]R

REFERENCE : C-DI8-85,157 (REQUESTER'S REQUIREMENT NO.) [redacted] (REQUESTER'S NAME AND PHONE) 25X1A

SUBJECT : Photo Analysis of Bi-Spectral Mission 1103 (KH-4B)

1. Various (COUNTRY) ____ (PLACE NAME) ____ (COORDINATES) ____ (WAC)

2. BACKGROUND INFORMATION: (Include degree of urgency and any facts bearing thereon, pertinent references, enclosures, etc.)

25X2 a. OSI/CIA has been working with TSSG/TAD/TEB of NPIC to develop procedures and techniques for utilizing the Bi-Spectral photography on an experimental basis for OSI/NED. A variety of additional targets have been covered by Bi-Spectral, and will need to be analyzed by NPIC as soon as (a) the most suitable targets have been identified from the black and white photography, and (b) the Bi-Spectral enlargements have been prepared. CIA will provide a list of additional targets as soon as they have been selected.

[redacted]

b. Priority 1: Due Date 15 June 1969.

c. Coordination: [redacted]

25X1A

ILLEGIB [redacted]

Please forward copy of response to the above.

3. SPECIFIC REQUIREMENT:

a. As a follow-on to the regular first and second phase exploitation of the mission, exploit the Bi-Spectral photography [redacted] covered by Mission 1103, working closely with OSI/NED on the R&D aspects. 25X2

25X2 b. Obtain enlargements of selected targets in other substantive categories, when identified, and exploit in accordance with specific requirements to be supplied as supplements to this requirement.

4. TYPE OF RESPONSE DESIRED: Inter-Office Memo.

25X1A

[redacted]

TOP SECRET [redacted] CLASSIFICATION 25X1

NPIC FM 188 (Revised 6-64) WT 1 Pri 2 Proj No 11768-8

Next 1 Page(s) In Document Exempt

Approved For Release 2002/09/03 : CIA-RDP78B04767A000300050023-7

TOP SECRET Basic Exploitation Planning
WORKING PAPER

[redacted] 25X1A

Copy 19

28 March 1968

MEMORANDUM FOR: Chairman, COMIREX

SUBJECT : Use of Bi-Color (Bi-Spectral) Filters Against [redacted] on KH-4B Mission 1103, 24 April 1968 25X2

1. As you know, the KH-4B system has an in-flight filter and slit adjustment capability which permits bi-color (bi-spectral) photography without committing an entire mission. NPIC has concluded there is no loss in ground resolution through red (usual) filter, and the loss through the green filter is the equivalent of going from KH-4B to KH-4A ground resolution. When viewed in stereo, the ground resolution for the usual black and white photography is somewhere between KH-4A and KH-4B photography. (See Tab A)

2. CIA's Office of Scientific Intelligence has a requirement to photograph [redacted] 25X2 25X2

25X1A

3. No further bi-color photography is scheduled after Mission 1103. Mission 1104 in June will test SO-180 (IR color), [redacted] 25X1 25X1 [redacted] (natural color). [redacted] These two films require alternate filters which are not compatible with bi-color. There are no film tests scheduled for [redacted] 25X1A 25X1 During the winter months we may have a snow cover problem with the priority [redacted] If we are to assess bi-color against CIA's requirement in 1968, therefore, it would be desirable to do so on Mission 1103. Should the readout bi-color passes on Mission 1103 demonstrate intelligence value, COMIREX could then exercise its option to take additional bi-color in the operational area [redacted] 25X2 25X1

4. COMIREX consideration of the requirement in Tab B would be appreciated.

[redacted] 25X1A

25X1

TOP SECRET [redacted]

TAB A

25X1A

TECHNICAL BACKGROUND AND RESULTS TO DATE

The Bi-Color Technique

1. Bi-color is simply spectrally filtered black and white photography. The only difference between bi-color and normal acquisition is the use of a green filter on one camera. Normally, we use red filters on both forward and aft looking cameras. In the case of bi-color, we use a green filter on one camera and a red filter on the other to provide for spectral discrimination. The green filter need not be used all the time but only on those passes desired, due to the in-flight changeable filter mechanism on the KH-4B camera. Conceptually, then, this technique works as follows:

a. To provide bi-color, the red and green filters are used. The normal high resolution black and white film, Type 3404, is employed. [redacted]

b. Dupe positives are made in the normal fashion. [redacted]

c. Since spectral separation is provided by the red and green filters, color can be seen if the two records are projected back through the red and green filters, and then superimposed. Although this is not complete color (the blue record is missing), highly realistic color can be produced with some manipulation.

25X1

SUBJECT: Technical Background and Results To Date

The records can also be evaluated, as black and whites for spectral differences. This may give clues as to the general composition of objects. The green record may also show objects which the normal red record does not show. The use of the bi-color records, then, is optional depending on the information desired. In summary, they can be used for any task from normal photointerpretation, to the production of "psuedo" color prints.

Results to Date

25X1D

2. Bi-color has been tested [redacted] and satellite [redacted] onfined itself to domestic passes and had the major purpose of assessing the use of satellite bi-color and its operational implementation. The highlights were as follows:

25X1 25X1

25X1A

a. A number of [redacted] were taken with the red and greed filters; the film from this acquisition was evaluated.

b. NPIC evaluated the film (in particular, the green record) to assess its photointerpretation use and quality. We were particularly interested in assessing the impact of the bi-color take on the ability of the photointerpreter to do his normal job. The results of the NPIC evaluation were reported in [redacted]

25X1A

25X1A

SUBJECT: Technical Background and Results To Date

"The general conclusion of the photo-interpreters is that the majority of the requirements levied for the KH-4B system could be answered with photography generated in the bi-color mode because when used in stereo, the two records complement each other. In addition, the overall information content of the photography exposed through the green filter is comparable to an average KH-4A mission."

25X1A

c. We also had our contractor produce several color prints from selected [redacted] This demonstrated that approximately natural color could be produced. This also demonstrated the problem of registration of the bi-color due to the geometry of the pan cameras. It was determined that orthoprinting was necessary to enable making bi-color prints. To avoid this problem, OSP provided NPIC with an Automatic Registration Electronic Stereoscope (ARES) which allows the photointerpreter to view his normal dupes in color. This equipment rectifies the images and allows NPIC to use the bi-color mode without orthoprinting. Other bi-color equipment is to be provided NPIC in the near future.

25X1A

[redacted]

SUBJECT: Technical Background and Results To Date

Conclusions/Recommendations

3. The NRO Ad Hoc Committee* conclusions and recommendations relative to bi-color are summarized as follows:

a. Bi-color can be successfully implemented on the KH-4B system.

b. Insofar as the PI is concerned, there is no loss in ground resolution through the red filter. The loss in the green filter is the equivalent of KH-4B to KH-4A photography. The PI can do his normal job with bi-color acquisition.

c. The intelligence value of bi-color has not been proven. To assess its use, it must be flown against specific intelligence requirements involving operational targets.

d. The NRO Ad Hoc Committee has concluded [redacted] 25X1A that there is no technical or photointerpreter reason why bi-color cannot be flown operationally if COMIREX so desires. The NRO Committee has concluded that the operational usefulness of bi-color can only be assessed by flying it against specific intelligence questions.

25X1

*NRO Ad Hoc Committee on KH-4B Photographi [redacted]

Next 5 Page(s) In Document Exempt

Approved For Release 2002/09/03 : CIA-RDP78B04767A000300050023-7

14 May 1968

MEMORANDUM

SUBJECT: Special Assessment of Bi-color KH-4 Photography

1. This division has been asked by the CIA Member of COMIREX to organize and lead a special assessment of the usefulness of bi-color photography from Mission 1103, with support from NPIC and IAS, and in collaboration with relevant offices of the Directorates of Intelligence and of Science and Technology. The assessment will examine the use of such photography concerning all types of intelligence targets.

25X1A 2. [redacted] (B4033, R1101) of this division will be the team chief for preparation of this special assessment. I request that you designate 25X1A to him one officer in your component to act as a contact point. [redacted] will then make arrangements for conducting the assessment through that officer.

3. I have asked [redacted] to complete the assessment by 10 June 1968. 25X1A

25X1A [redacted]

Chief, Regional Analysis Division, OSR

[redacted] 25X1

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